BULLETIN No. 16. (Dairy No 7.)

U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF ANIMAL INDUSTRY.

THE DAIRY INDUSTRY

IN

NEBRASKA, SOUTH DAKOTA, AND NORTH DAKOTA.

BY

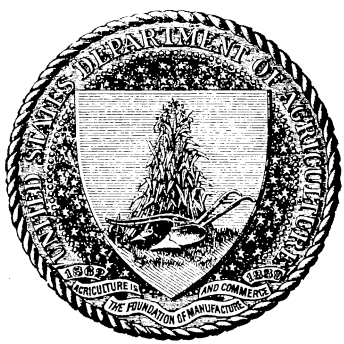
JOHN H. MONRAD,

SPECIAL EXPERT AGENT, DAIRY DIVISION.

Under the direction of

Dr. D. E. SALMON,

Chief of the Bureau of Animal Industry.



WASHINGTON:

GOVERNMENT PRINTING OFFICE.

1896.

Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

BULLETIN No. 16. (Dairy No 7.)

U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF ANIMAL INDUSTRY.

THE DAIRY INDUSTRY

IN

NEBRASKA, SOUTH DAKOTA, AND NORTH DAKOTA.

BY

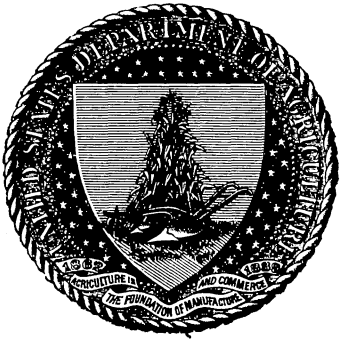
JOHN H. MONRAD,

SPECIAL EXPERT AGENT, DAIRY DIVISION.

Under the direction of

Dr. D. E. SALMON,

Chief of the Bureau of Animal Industry.



WASHINGTON:

GOVERNMENT PRINTING OFFICE.

1896.

LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ANIMAL INDUSTRY,
Washington, D. C., October 27, 1896.

SIR: I have the honor to transmit herewith a report upon the dairy industry in Nebraska, South Dakota, and North Dakota, prepared under the direction of Henry E. Alvord, Chief of the Dairy Division of this Bureau, and based upon reports by John H. Monrad, special expert agent of that Division, and to recommend its publication as a bulletin of this Bureau.

Very respectfully,

D. E. SALMON,
Chief of Bureau.

Hon. J. STERLING MORTON,
Secretary of Agriculture.

CONTENTS.

	Page.
Historical	7
Farm dairying and creamery patrons	9
In Nebraska	9
In South Dakota	11
In North Dakota	12
Ladled butter	13
Creameries	16
Cheese factories	20
Extent and value of dairy interests	20
General remarks	21

THE DAIRY INDUSTRY IN NEBRASKA, SOUTH DAKOTA, AND NORTH DAKOTA.

HISTORICAL.

The dairy industry in the States of Nebraska, South Dakota, and North Dakota is in a comparatively new and formative condition, as are large portions of the States themselves. But agencies have already been created for assisting in the development and improvement of dairying. Each of these three States has its organization for joint effort by those engaged in this branch of farming.

The Nebraska Dairymen's Association resulted from the enterprise of a few men, and started in the year 1885 with J. Dixon Avery as president and H. H. Wing as secretary. (The latter is now at the head of the dairy department of Cornell University.) This association held its eleventh annual convention at Lincoln in December, 1895. It is generally considered that the work of the organization has been effective and has decidedly raised the average quality of Nebraska butter. The State has recognized this usefulness by appropriating $1,000 a year for the association, beginning with 1890. It is stipulated that at least 2,000 copies of the proceedings of the annual convention shall be printed and distributed. Particular activity has been shown by the association in recent years. It has provided for the expenses of a dairy speaker at a dozen or more farmers' institutes annually, has issued good reports, and also distributed circulars of information as occasion required. Much of this evident enterprise is credited to the present secretary, S. C. Bassett, of Gibbon, who is cordially supported in his good work by the president, E. F. Howe, of Crete, and by a wide-awake board of directors.

The South Dakota Dairy Association was organized in 1892, and held its fifth annual convention at Huron in January, 1896. The president is A. H. Wheaton, of Brookings, and the secretary, W. F. T. Bushnell, of Aberdeen. No State aid is yet given to the association, but the last annual meeting was well reported through the enterprise of the Dakota Farmer, of Aberdeen.

The North Dakota State Dairymen s Association held its second annual meeting in February, 1896, at Fargo. J. P. Power is president and E. E. Kaufman is secretary. The latter is dairy instructor at the State Agricultural College. Although in its infancy, this association has made a good start, and its proceedings have been published by the State department of agriculture and labor, whose head, A. H. Laughlin, is ex officio State dairy commissioner.

In all three States there have been farmers' institutes held for some years, and the dairy has been given fair consideration in the selection of topics for discussion. The State university and agricultural colleges encourage these meetings and furnish lecturers. They are also materially aided by the liberality of the railroads. The latter might well do more in this direction, as it is plainly in their own interest to foster any kind of educational meetings among the farmers. In Nebraska the institute work is well organized, although without State aid. In the Dakotas the work is not so systematically done and there is great room for improvement.

No dairy journal is published in any of these States, and none appear to be largely read among their farmers. The general agricultural papers give more or less attention to dairying, and a number of the county and local papers do likewise. There is opportunity for much usefulness through these channels, and it is suggested that the State dairy associations might accomplish great good by preparing weekly a column or so of well-selected dairy literature and distributing it to the local journals, which would, in nearly all cases, be glad to get this material and use it. The expense of such an undertaking would be moderate and would be fully justified by the missionary effect.

In the line of technical dairy instruction, the Dakotas are in advance of Nebraska. Lectures on dairying are given in connection with the agricultural course and the "short course" at the Nebraska State university at Lincoln, and these are accompanied by a few practical exercises. It is said to be the purpose of this institution to soon erect a dairy building and operate a small creamery. At the State college at Brookings, S. Dak., there is a neat little creamery in operation, and instruction, both theoretical and practical, is given in the making of butter and cheese. A cheese-curing room is a much-needed addition, and for this climate such a room should be built half under ground. The citizens and corporation of Fargo, N. Dak., contributed the funds necessary to build a commercial creamery in connection with the State agricultural college at that place. This is well managed and forms the basis for a yearly course of creamery instruction, and also a three months' course in the winter.

The conditions prevailing in all these States are such that much more good might be accomplished by perambulating dairy schools, operating a month in a place, after the plan successfully followed in

England, Ireland, and Belgium. The number of persons who might thus be instructed is very large as compared with the few who are able to attend the college courses, and the great need at present is to reach the isolated private dairymen or farm dairies and improve their methods. The creameries and factories can supply themselves with expert butter and cheese makers with comparative ease.

FARM DAIRYING AND CREAMERY PATRONS.

In Nebraska dairy farming has been well established in the eastern half of the State, and especially in the southeastern portion. It is also carried along the southern counties of the State almost as far as the eastern boundary of Colorado. An exceptional dairy district is found in some of the northwestern counties. There are comparatively few of the farmers as yet, however, who really make a specialty of this branch of agriculture. Most of them milk only 3 or 4 cows, or half a dozen at the most, and if they do not sell milk or cream their surplus butter generally goes to the local storekeepers in trade and finds its way largely to the "ladlers" or dealers in promiscuous butter. The latter report quite an improvement in the quality of farm dairy butter made in the State during the past ten years.

Sarpy County, on the eastern boundary of the State, is quite prominent in dairying. One-tenth of the farmers are dairymen, keeping an average of 12 cows. Nine-tenths of these animals are grades and nearly one-tenth are of full blood. The milking period is nine months. The pastures consist of blue grass, timothy, and the native grasses of the prairie. Winter care and feeding is good and constantly improving. From 3,500 to 5,000 pounds of milk per cow is expected in the season. The milk is set in stone jars, tin pans, and deep cans; a few hand separators are used. The farmers find markets for their butter in Omaha and vicinity and sell to private customers at 20 and 25 cents a pound; some contract at 20 cents for the year. In a few cases 25 and 30 cents have been regularly paid for a superior article. The proximity of Omaha is the chief incentive to the dairy development in this county.

In Platte County, in the central eastern section, about one-fourth of the farmers make a specialty of dairying, and their herds average 20 to 25 cows. The pasturing season is for four or five months, and the stable feeding embraces ground corn and oats, hay, corn stover, and millet. Milk is generally deep set, and some separators are used. Swiss cheese and soft forms of cheese are made to a considerable extent in this county.

A little farther west, in Boone and Greeley counties, dairying is still a side issue and mainly confined to the vicinity of creameries. Farms will average about 5 cows, and these are milked not more than eight months. The pasturing season lasts five or six months, the natural

grasses of that region being excellent and the chief reliance. In winter, straw stacks and stalk fields replace the pastures, but some hay and grain are fed, and the building of several silos during 1895 indicates increased interest in dairying and a better appreciation of the efforts necessary to success. Most of the milk is produced between April and October, and there is little activity in winter. Jersey and Holstein blood is seen in the herds, but an annual milk production of 2,500 pounds is accepted as satisfactory. Deep setting of milk is practiced, and the butter produced sells at 7 to 15 cents per pound.

In the southern and southeastern part of the State, in the counties from Adams to Jefferson, only 5 per cent of the farmers are reported as engaged in dairying. These keep from 5 to 10 cows to a farm. Two acres are represented as carrying a cow, on natural pasture, but an estimate of 3 acres to a cow seems more general and reliable. The pasturing season runs through six months, if not uncommonly dry, and the cows are milked only seven or eight months. Winter care is poor, with little feeding except at stacks. Yet one farmer who has improved stock says he is able, by soiling, to make 1 acre support a cow, and he adds: "My experience in Nebraska is that if one keeps good cows and feeds them well they are as profitable as in any other State."

Personal observation appears to justify this last opinion, at least for the counties of Nebraska lying east of Adams. But it seems necessary to resort to soiling, more or less, for satisfactory results, and more use should be made of alfalfa, if it will grow as indicated by numerous trials. The dry seasons to which this region is more or less subjected kill off the tame pastures badly, and it is very unwise to break up the native prairie sod unless one is prepared to resort mainly to soiling as a substitute.

The conditions applying to Adams County, as above, and to Webster, immediately south of it, also apply to the double tier of counties extending westward from these along the southern border, at least halfway across the State.

Some exceptional conditions are reported from northwestern counties, especially Boone and Sheridan. This region was settled in 1885 and continuous wheat growing was practiced until stopped by droughts and low prices. Now about half the farmers keep cows, from 2 to 6 or 8, possibly averaging 6. A few herds are reported of 15 to 20 cows each. Most of the cows are grade Shorthorns, and they are milked eight or ten months, although they have fresh pasture only about five months. The feed consists of the native buffalo and other grasses, which cure upon the ground, so that a sort of unharvested hay is available in the fields or on the range during most of the winter. If covered with snow, hay, cornstalks, and perhaps a little grain are fed under sheds. Deep setting is the prevailing way for handling the milk, and 150 pounds of butter in a year is a usual product per cow. Some of this butter finds

special markets at 15 to 25 cents per pound, but much the greater part of it is traded at stores and shipped to the ladlers.

Private dairymen all over the State are gradually improving in the care taken of their milk, and hence the quality of its product. The same is true of those who sell to the creameries. The use of deep-setting methods is becoming general, but there is room for much improvement in detail. For cooling milk, tanks have to be generally depended upon, into which water is lifted by wind or other power. In many cases the water enters the tank near the top, on one side, and the outlet or overflow is just opposite; this develops very little motion of the water in the tank. The inlet pipe should open at the bottom of the tank, to insure full benefit from the fresh, cool water. Where wind is depended upon to change the water and fails, the tanks are too often neglected. The handling and ripening of the cream does not seem to be as well understood as the cooling. As said before, there is evident need of missionary work with good dairy literature or an itinerant dairy school.

Cheese making on farms is practiced more or less, but it is difficult to obtain any reliable data on the subject. The secretary of the State association estimates that something over half a million pounds were made in 1895. This would indicate that about 150 farmers make cheese at home, from an average of 13 or 14 cows each. The most important need in this work is knowledge of the correct construction and management of a curing room.

In South Dakota the conditions are much the same as in Nebraska, and it is needless to give reports received from different counties, in detail. Dairying has been developed mainly in the eastern half of the State. There are a few experienced dairymen doing good work, but most of the milk is produced by farmers who keep a few cows apiece, simply as incident to their general business.

As an example of what it is possible to do in the way of farm cheese making in this State, the following is copied from a recently published letter from the owners of a dairy at Ordway:

> Our prairie hay is considered very nutritious and it is certain our stock does well on it. We raise considerable grain of one kind and another, but, except as that helps out our feeding, we find that stock raising and dairying pay better. During the year 1895 we made from 27 grade Holstein cows 15,250 pounds of cheese, or an average of 565 pounds per cow. This was cured in a temperature of 65° to 70° F., and sold to realize 9½ cents net per pound. We raise all our good calves, feeding them after 1 month old on whey, to which is added wheat bran and middlings or bran and barley meal.

The following table of reports from creamery patrons in South Dakota was recently compiled and published by the Dakota Farmer:

Reports received from farmers in South Dakota.

Post-office.	Number of cows milked.	Number of months covered by report.	Total amount received for cream.	Average per cow per month.	Per cent of fat in test of milk, average.	Number of calves dropped during time of report.	Value of calves dropped during time of report.	Are reports encouraging?	Number of cows will milk next year.
Aberdeen [1]	7	12	$285.19	$3.40	3.7	6	$35.00	Yes...	10
Esmond [2]	24	5	200.00	2.00	4.4	.....	.....	Yes...	21
Huron [3]	12	7	325.75	3.87	.....	12	50.00	Yes...	20
Huron	12	9	305.00	2.82	3.9	12	120.00	Yes...	21
Huron [4]	21	9	425.86	2.25	3.7	21	189.00	Yes...	21
Huron [5]	22	9	538.53	2.45	3.8	16	100.00	Yes...	30
Huron [6]	10	7	197.44	2.82	4	6	36.00	Yes...	20
Iroquois [7]	9	12	182.93	1.60	4.2	9	72.00	Yes...	12
Iroquois [8]	12	12	382.12	2.65	4.1	12	96.00	Yes...	18
Kidder [9]	12	9	324.00	3.00	4.3	12	120.00	Yes...	30
Lake Preston [10]	5	2	52.69	5.22	4.4	3	27.00	Yes...	15
Millbank [11]	10	12	.....	3.50	4	10	40.00	Yes...	10
Waukonda	5	7	103.00	2.91	4	6	55.00	Yes...	6
Do	4	7	67.00	2.40	3.9	1	3.00	Yes...	6
Madison	6	8	180.54	3.76	.....	.....	.....	.....	.....
Do	6	6	102.06	2.83	.....	.....	.....	.....	.....
Do	8	12	298.93	3.11	.....	.....	.....	.....	.....
Do	12	12	275.07	1.92	.....	.....	.....	.....	.....
Do	13	12	423.65	2.72	.....	.....	.....	.....	.....
Do	2	4	42.89	5.36	.....	.....	.....	.....	.....
Do	7	12	167.21	2.00	.....	.....	.....	.....	.....
Do	4	10	113.36	2.83	.....	.....	.....	.....	.....
Do	4	12	155.20	3.21	.....	.....	.....	.....	.....

REMARKS.

[1] I did not milk over six at any one time during the year.
[2] Cows are strippers; am expecting new milkers soon.
[3] I consider the creamery business the best of any occupation.
[4] Huron creamery now getting 49,000 pounds milk per week.
[5] Received and fed to hogs about $25 worth of skim milk.
[6] Think the farmers of Beadle County are on the way to prosperity.
[7] Cows had nothing but hay the whole year; will feed grain next.
[8] These were just ordinary cows and cost not more than $15 each.
[9] Dairy business paid me more cash than did 500 acres of wheat.
[10] Want 25 cows as soon as can get them; had none come in early.
[11] Our cows have averaged $40 per year, and that is good.

In North Dakota the same state of affairs has been observed and reported. The greatest dairy activity prevails in the counties of Cass, Grand Forks, Dickey, Ransom, and Sargent. The usual milking period is seven months, and of these four are passed on pasture. The bulk of milk is produced during May, June, and July, and the average yield for the year is 3,000 pounds per cow. Private dairies generally practice the deep setting of milk, in water, pumped into tanks. Butter is largely sold to customers in the neighborhood or within easy reach, in 5 and 10 pound jars, at 20 cents a pound in summer and 25 cents in winter. There is a considerable quantity, however, which goes to the storekeepers at less than 10 cents a pound and is shipped out of the State to be ladled.

The reason for so much of this butter going to this questionable object is its very poor quality and condition from the time it leaves the

farms where made. It is not even good enough for the local demand, which still exceeds the supply in many sections of the State. Thus the farmers lose their home markets and get but half price for their product, because they will not learn to make better butter, take proper care of it, and make it in a rational way.

Active measures should be taken by the dairy associations in these three States to improve the quality of farm-made butter and stop the heavy loss resulting from the large contributions from these States to the supply of "ladled." The creameries are doing a good work in their way, but for years to come there will be farmers who can not well be creamery patrons, and these need all the help that can be given them. Attention may well be called to the work which several States, notably New York and Wisconsin, are doing to improve the grade of dairy products from the farms as well as from the factories. This same line of work is still better organized and conducted in Canada, with apparent and gratifying results.

LADLED BUTTER.

In all parts of the country where butter is made by small farmers at their homes, more or less of it is disposed of at the country and village stores. Of this, the condition of a considerable part is such that the merchants can not sell it to their retail customers. These numerous small lots of poor, damaged, and thoroughly bad butter have to be disposed of as grease or go to establishments which gather large quantities of the material and so manipulate and "renovate" it as to bring it into a merchantable form as a food product. In the butter market quotations these goods are called "ladles."

The newer dairying districts produce immense quantities of this class of butter, or that which, after treatment, comes to be thus known, and the largest establishments for handling this material are in the Northwest. One or two are located in Nebraska. There are none yet in the Dakotas, and the ladle butter from those States is at present sent to Minnesota and Iowa factories for renovation; some of it to Chicago.

It is impossible to determine with any accuracy the quantity of this low-grade dairy butter made in the three States under consideration which is contributed to the ladle-goods business. The rapid increase in the number of creameries tends to reduce this business, but farm dairies seem to be multiplying with equal rapidity, thus maintaining the supply. A careful canvass of the larger firms and their courteous replies to inquiries has enabled the following estimate to be made, and it is considered approximately correct:

Ladled butter produced in the year 1895 from the States named.

	Pounds.
Nebraska	7,400,000
South Dakota	1,300,000
North Dakota	500,000
Total	9,200,000

Not included in this estimate is the butter shipped from these States to ladle factories east of the Mississippi River and that which, originally shipped out of the States where made as private dairy butter of fair grade, finally finds its way to the ladlers.

This business is carried on as follows: The local storekeepers take butter in exchange for goods. The price allowed all producers at any one store is the same, quite regardless of the quality of the butter; it is necessary to treat all the farmers alike. As a rule, merchants sell what they can of the best received, without any profit or at an advance of 1 or 2 cents. The remainder, which in most cases constitutes much the greater part of the receipts, is dumped into receptacles of all kinds, and periodically sent off to the centers for ladling. Flour barrels, starch boxes, shoe boxes, and soap boxes have been indiscriminately utilized for this purpose. Much of this so-called butter is of such character that it makes little difference how it is neglected. The carelessness and indifference shown in some places is shocking. The receptacles are left open, no attention paid to the mixed contents, and they are not sent away until full, or until the mixture becomes so offensive that it must be got rid of. The one requirement of the package has been that it should not leak and waste too much, if the contents melted to oil in transit. Economical motives alone seem to have led to a reform in this regard. The ladlers now send out what are called butter stands to their regular sources of supply. These are large oak tubs or barrels, generally somewhat conical, with large bottoms to prevent overturning, tight covers, and strong handles. These are shipped to the factory when filled at the store. The contents of some of these tubs upon arriving at the ladling establishment is simply indescribable; the many small lots of butter—as the material was probably at one time entitled to this name—differ in color, salt, texture, age, and other respects, and sometimes the tubs contain articles quite foreign to the dairy, like bacon rind and mutton-chop bones. In cold weather it is possible to measurably separate and sort the different lots; in hot weather it is simply a mass of grease, not sufficiently melted to be homogeneous, but so far advanced as to make it impossible to vouch for all being originally butter fat.

The ladlers receive this material, grade it as best they can, and make their own returns to the shippers, as to both weight and quality. During the season of 1895, the average price paid by ladlers for shipments from these three States, was just about 10 cents per pound, the shippers paying freight to Omaha, or wherever the factory was located. Freight charges probably averaged half a cent a pound.

There are efforts in progress on the part of ladlers to improve the quality of their product by securing some degree of care in the collection and transportation of the country butter. Merchants are encouraged to hire collectors to get the butter from the farms, uncolored and

unsalted. The following circular letter from one of the ladling concerns further explains this business:

MAY 8, 1895.

GENTLEMEN: We ask your attention to this circular regarding the handling of butter during the summer months. The low price of butter on the Eastern as well as the Western markets warns us to use every effort possible to turn out a better grade of butter than ever before, for this reason: The butter market has come to that point where the quality governs the price; much of the poor butter is caused by improper handling, and we offer a few simple yet valuable suggestions which we ask you to carefully consider.

(1) When you receive butter from the farmers keep the good butter separate from the poor.

(2) Keep your butter in a cool place, free from all odors of any kind.

(3) Don't hold your butter longer than necessary to get a shipment, for every day you hold injures the quality of the butter and consequently reduces the price.

If you send us good, fresh stock you are sure to get the highest price in return, and a trial shipment of butter will convince you that we mean business and will follow out the principles of this circular to a letter. We are in business to stay, and as our reputation is at stake we feel it is for our best interests to give our shippers, one and all, a square deal, top price, and prompt returns every time. At present, regardless of the low price of butter East and West, we quote you the following cash price f. o. b. your station: Good, fresh butter, per pound, 8 cents; poor butter, per pound, 6 cents.

Our butter stands we furnish free, but parties shipping to other buyers our stands will be charged $1 for each stand.

Thanking you for past favors, and hoping to receive a continuance of your patronage, we remain,

Yours, truly, ——— ———.

The profit of the ladlers lies in intelligent grading and increase in weight by salting, washing, and reworking; also, more or less, in the success of the various processes used in eliminating rancidity, and restoring the semblance of grain and flavor to the mass. The article resulting is called butter and goes into the butter market, but it may well be doubted whether, as a food product, it is as good as average butterine. As a rule, "ladles" are quoted in the Chicago market at about two-thirds the price of creamery butter and about four-fifths the price of dairy butter of like grade, "extras," "firsts," or "seconds." What is known as "imitation creamery" is, as a rule, nothing but selections of the best of the ladled goods.

There is no intention of fully describing here the processes of ladling at the establishments built for that purpose. These processes differ a good deal and involve both mechanical and chemical treatment of the butter. The present purpose is to call attention to the large quantity of farm-made butter which goes through this mill and takes this low grade, which ought to yield the producers half as much again, and perhaps twice as much, and would do so if the right methods of manufacture were adopted. The extension of the creamery system is probably the surest and the quickest way of correcting the evil. But much farm-to-farm teaching of the elementary principles of caring for milk and of making and marketing butter is needed.

CREAMERIES.

With a view to making a report upon the creameries of Nebraska, South Dakota, and North Dakota, and upon their work, without spending too much time in personal inspection, blank forms were prepared and distributed in the hope of thus securing the main facts, which might then be summarized. The most accurate lists obtainable of these establishments in the States named were used, but the result, as given in the following table, shows the difficulties attending such an effort and the uncertain value of the information thus obtained.

Number of blanks sent and replies received from creameries and cheese factories.

State.	Blanks sent.	Returned undelivered.	Supposed to be delivered.	Replies received.	Per cent of replies.	Remarks.
Nebraska	145	24	121	29	23	Two cheese factories.[1]
South Dakota	108	17	91	27	30	Two cheese factories.[1]
North Dakota	28	0	28	9	32	One cheese factory.[1]
Total	281	41	240	65	27	

[1] Included because so few.

Replies having been received from only one-fourth of the factories believed to be in operation at the time, it is manifestly useless to tabulate the returns for use in a statistical way. But assuming that the reports received were from representative establishments, they form, in connection with notes taken at the creameries which it was possible to visit, a reasonably satisfactory basis for sundry remarks and suggestions.

Nebraska has suffered from three successive seasons of extreme drought. Yet in comparing results with other States, her creameries appear to be able to do about as well, in rates of payment to patrons, as the northwestern dairying regions in general. And this, too, notwithstanding the frequent necessity for long hauls to the creameries, and consequent increase in the cost of manufacture. The farmers in this State who have been turning their attention to dairying, as creamery patrons, have done better in fact than they appear willing to acknowledge in conversation. Claiming that they had no time to milk cows, that they had unreliable pastures, and that they ought to let cows alone and cultivate their farms—it was easily proved, and often finally admitted, that the cows paid better than the crops, and during these trying years they would have starved, had it not been for the sales of milk, cream, and eggs.

It is evident here, as in most parts of the West, that the farmers spread their labor over too many acres of land. Better attention to smaller areas under cultivation and the provision of fodder crops to help out dry pastures would rapidly improve the condition of most of those visited.

The creamery buildings in the State are of varied quality and capacity—good, bad, and indifferent. The gathered-cream plan was unfortunately adopted very largely at first, and when the introduction of the separator caused a very general change of system, mistaken economy led to inadequate changes in the buildings, so that many creameries are now operated in quarters which are cramped, inconvenient, and hard to keep clean. Nevertheless, the average condition of Nebraska creameries as to buildings and equipment compares favorably with that in other States.

The West Point Creamery was the pioneer in this business in Nebraska, and probably the first to operate west of the Mississippi. It was established as early as 1878, before there was a creamery in the New England States. New York men were largely interested in the enterprise at its start, and as milch cows were then scarce in Cuming County, the company took up 800 acres of land and procured a stock of over 300 cows, so as to produce most of the milk needed. Guernsey and Jersey bulls, as well as some cows, were brought from the East, and the company graded up its herd. Holdings were increased, lands leased, and at one time the company owned 1,700 head of high grade dairy cattle. Feeding these cattle involved farming operations on a large scale, and as butter was the main article for sale, a large business was done in raising hogs on the skim milk. The silo system was adopted, and the farm has storage capacity for 800 tons of silage and 500 tons of sugar-beet pulp. As fast as offered this creamery took the product of neighboring farms on the cream-gathering plan and early adopted the advanced method of paying on the basis of tests by the oil-test churn. In 1891 the company was reorganized and has since done less in farming and live stock, but the creamery business has been extended, and besides butter, large sales of milk and cream are made in Omaha. The company has a large depot there and regards that city as the center of the market side of its operations. Enough cream is still bought in West Point and vicinity to make about 1,500 pounds of butter a day in the height of the season. The milk from 275 cows, on the home farm, mainly goes to the city market. One hundred heifers of high-grade Jersey and Guernsey blood are being reared to maintain and increase the herd. The entire establishment is under most capable and systematic management. A complete record is kept of the performance of every cow, and all the operations in the creamery are also the subject of current record. Yet it seems odd to find in such a large establishment that no separator is used, cream being raised by the old gravity method, with shotgun cans in cold pools, and fat tests of the skim milk and buttermilk are still unknown.

The daily milking of 200 to 300 cows is a serious business anywhere, and the labor question involved is often a difficult problem to manage. The West Point Creamery has adopted and successfully conducts a somewhat unusual system. From families of foreign extraction in the

neighborhood, 20 women are hired for an hour and a half at morning and the same time at evening, daily; these do the milking and do it exceptionally well and economically. They are paid 30 cents a day, and each one milks 14 cows in the allotted time; some of these women draw 300 pounds of milk in 90 minutes or less.

The Nebraska Creamery Association is located in Fremont, right in the city, and it operates there the largest plant of its kind in the State. This was established in 1881, being organized as a stock company, and it is still conducted as such. It has always been run on the cream-gathering plan, modified by the circumstances of location and the extent of the business. Cream alone is brought to the central factory. The supply is drawn from parts of 8 different counties, and comes by wagon over 20 routes, and also by rail from several separating stations maintained by the company at suitable points. All the gathered cream is sampled and subjected to the old style churn test, and upon these test results the payments to patrons are made. At the stations the milk is sampled and tested for fat by the Babcock method. At times in the past it was found that the cost of gathering cream by wagons was much too great, reaching 7 cents to the pound of butter, in some instances. Hence the plan has been adopted of paying cream gatherers according to quantity of butter made from the cream they deliver; 3 cents per pound of butter is paid in winter and 2½ cents in summer. Various checks are used upon the gatherers to insure freshness and quality in the cream they bring. The factory managers greatly prefer cream from their own separating stations because in so much better condition, resulting in a higher grade of butter. The railroad freight on the cream from stations within 30 miles is 15 to 20 cents per can of 10 gallons, can returned free. With the exception of small local sales, this large establishment makes all the cream it receives into butter, and generally sells the entire product to dealers who receive the same at the railroad platform adjacent to factory. Buttermilk is sold to patrons at 25 cents a barrel, and to outsiders, who buy it quite largely at the factory, at the same price for a 10-gallon can. The largest business was done by this creamery in the year 1887, when as much as 2½ tons of butter were made per day. Various causes have since decreased the product, which has been from 1,000 to 1,500 pounds daily during the past year. Patrons at the separating stations have lately been paid an average of 12 cents per pound of butter fat in the milk delivered by them; and those upon the gathering routes have been paid 10 and 11 cents per pound of butter oil, determined by the oil-test churn.

It is worthy of note that several attempts by farmers in the vicinity of Fremont to conduct cooperative creameries have failed. These have been small concerns and without experienced business management. The rivalry of the big factory, and the economy possible because of the extent of its operations, appear to have been too much for successful opposition. Yet this creamery has never paid large dividends to its

stockholders, and at times it has run at a loss. The capital stock was originally $50,000, but it has been reduced one-half.

Among the creameries of Nebraska, a group known as the South Platte creameries is worthy of special note. These are located in the four adjoining counties of Butler, Polk, York, and Hamilton, the central factory and office being at Aurora, in the last county named.

The Waterloo Creamery Association is another large concern, owning 1,500 acres of land and keeping 400 cows in Douglas County. It is mainly engaged in the milk supply of Omaha, having its office and principal depot in that city.

In South Dakota, the creamery business may be fairly said to have been "booming" during the years 1895 and 1896. Fully 100 new creameries commenced business in the spring of 1896. Nearly all of these are separator factories, no other system being heard of now. A good many of these are cooperative creameries, and such have naturally made the best payments to patrons. The highest average payment for milk reported the past season was 73 cents per hundred pounds, by a cooperative concern, and from this the rates ranged down to 49 cents for a proprietary factory. The average for the State must have been about 62 cents per hundredweight of milk. This shows an excellent average quality of milk.

It is interesting to note that the greatest successes in these new creamery ventures have been in neighborhoods where crop failures have seemed disastrous. This is partly explained by the remark of one patron: "Yes, I like the creamery first rate. Last year I kept only 3 cows and this year have 24. I *had* to do *something*, and the cows were the only things that paid. But I had to be starved into feeding them and milking them."

A good many of the creameries a year or two old, some even less, have had to be enlarged and their general condition seems to be healthy. Some failures there must be, and a few cases are noted where crop failures were so complete as to force patrons to sell their cows.

North Dakota reports are few and unreliable. In this State a good ice supply can be relied upon and the cream-gathering system is therefore in more favor. The average quality of milk seems to be even better than in South Dakota, but the payments to patrons for milk and cream are at lower rates. All the natural conditions favor the rapid and successful extension of dairying under the creamery system in the southeastern portion of this State.

Nearly all the creameries in these three States are built of wood, with iron smokestacks, and, according to the best information obtainable, not one-third of them are insured. The most common causes for criticism are faulty management of the waste products, buttermilk and skim milk, and insufficient provision for drainage, which will surely result in serious trouble after a time. The general interior care is of about average grade, but in a good many places there is need of

constant repetition and enforcement of the fundamental creamery rules for order and cleanliness.

CHEESE FACTORIES.

Cheese making on the factory plan has not become established to any extent in the three States under consideration. North Dakota seems to have done more than the others in proportion to age and population, although the aggregate product of Nebraska is larger. It is claimed that during last year about 1,000,000 pounds of cheese were made in factories in the latter State and about half as much on farms. In North Dakota the estimate for the same year is 400,000 pounds for factory cheese; this is probably in excess of the fact. In Nebraska reports show about 9½ pounds of cheese produced from 100 pounds of milk, and North Dakota reports show something over 10 pounds. In the former State one factory paid an average of 63 cents per hundredweight for milk; this was doing well. The factories in these States seem to run very short seasons, and their greatest difficulty is in curing. Good curing rooms are rare. In Nebraska, and perhaps in South Dakota, it will probably be found necessary to put the curing room partly under ground to secure even temperature, but it must be kept dry and well ventilated. Expensive buildings are needless. In some parts of the West there are cheese-curing rooms dug 4 or 5 feet into the ground, carefully drained, and the earth walls simply lined with matched boards; there is a building above to partly shade the place. Such rooms, properly managed, are found to answer their purpose well.

The progress made already shows that opportunities and conditions are good for successful cheese factories in Nebraska and the Dakotas, and their number can be largely increased to advantage if a home trade can be worked up for their products. This should not be difficult.

EXTENT AND VALUE OF DAIRY INTERESTS.

From all obtainable data, an estimate has been made of the principal items connected with the dairy industry in these States. The figures given in the following table can not be verified, but there are good reasons for considering them approximately correct:

Extent and value of dairy interests in Nebraska, South Dakota, and North Dakota.

State.	Milch cows owned.	Value of cows (estimated).	Milk produced—yearly quantity and value.				Creameries.	Cheese factories.
			Average yield per cow.	Total milk produced annually.	Value of milk per cwt.	Total value of milk produced annually.		
	Number.	*Dollars.*	*Lbs.*	*Cwt.*	*Cents.*	*Dollars.*	*No.*	*No.*
Nebraska	563,313	13,000,000	2,430	13,688,500	53	7,254,905	119	2
South Dakota	278,928	6,400,000	2,500	6,973,000	61	4,253,530	89	2
North Dakota	146,328	3,250,000	2,300	3,365,000	55	1,850,750	27	6

The most probable cause of error in this table is the low annual milk yield assigned to the cows in these States, but the rates given are sustained by reports of actual facts, which appear to be reliable. The figures exhibit the average milch cow of this region to be an animal of very doubtful profit, for in South Dakota, which makes the best showing, the gross income per cow, in milk, would be but $15 a year.

GENERAL REMARKS.

An evil which exists in these States, and appears to be increasing, is the system of short-term tenantry on farms. The extension of dairying and progressive farming in any form is likely to be very slow while this system prevails. It is usual to find in almost every town and village in these States capitalists (or their agents) who own several farms and who rent them on shares. This would not be very objectionable if the farms were leased for terms of ten years or more. But the one-year term is very common, if not the rule, and this is detrimental alike to the interests of owner and tenant. It is incompatible with good farming, and sure to result in deterioration of the farms. Bankers, agents, and all concerned should encourage the division of lands into small farms and their settlement by owners, or leasing on long terms, if at all.

Bankers, merchants, and professional men do not seem to sufficiently realize how closely their interests are allied with the condition of farming in their region. They should encourage enterprise in farming in every possible way; aid and patronize educational organizations, institutions, and meetings—like farmers' institutes, conventions, and dairy schools—and generally assist in the application of intelligence and enterprise to the farm and dairy interests of their States.

O